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ALMOND INDUSTRIES OF ITALY AND SPAIN

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Economic Analysis
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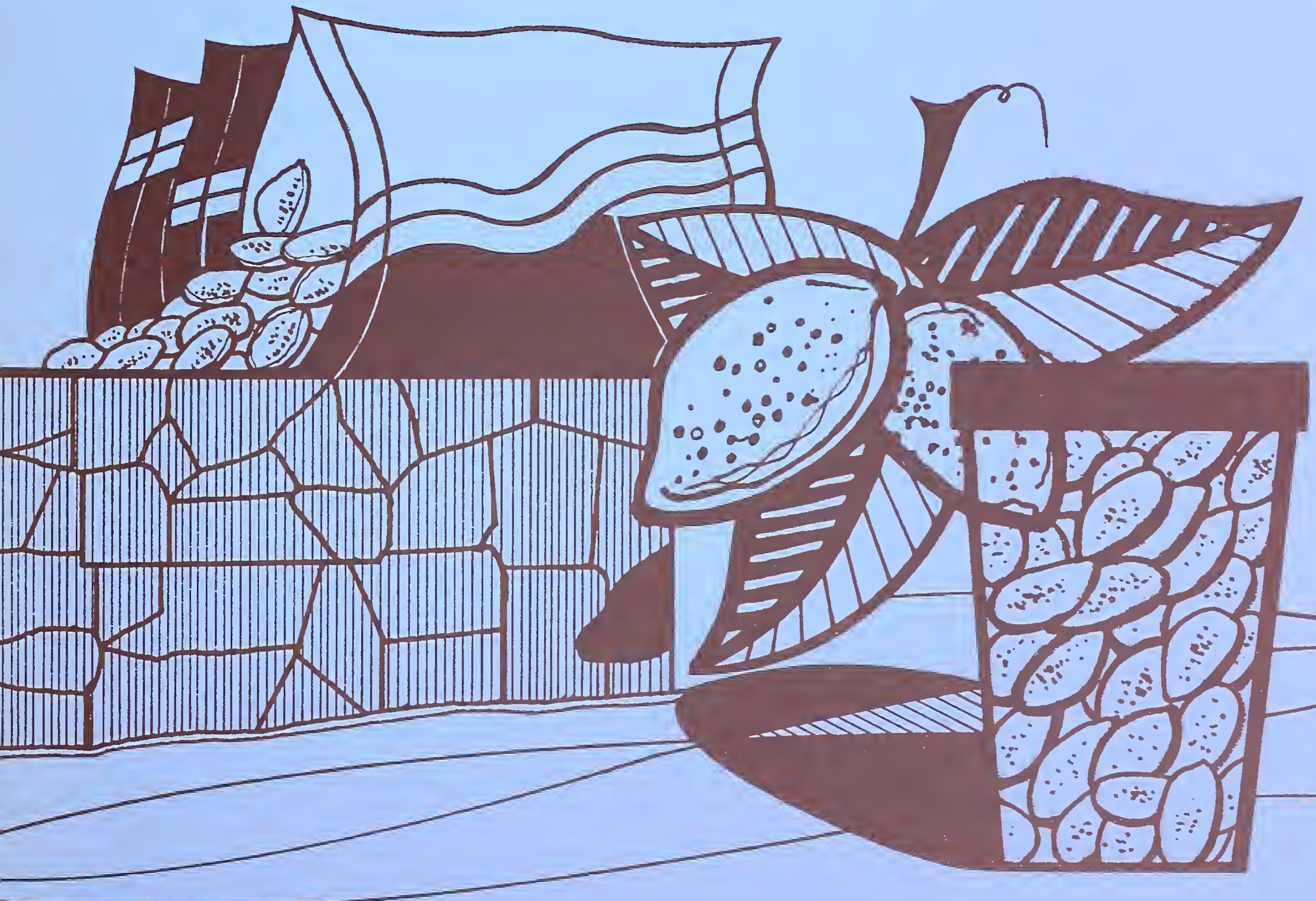

U.S. DEPARTMENT OF AGRICULTURE • FOREIGN AGRICULTURAL SERVICE • FAS-M 228 • MAY 1971

FOREWORD

In the past, Italy ranked as the world's leading almond exporter, followed by Spain and then the United States. Today, however, the situation is dramatically changed, with the United States holding the No. 1 position in both almond production and trade. From an average of 35,300 short tons (shelled basis) during the 1961-65 period, U.S. production rose to a record 64,200 tons in 1969. And annual harvests of 100,000 tons are expected by 1975 as new acreage comes into bearing.

Exports are playing an important role in the orderly market flow of these growing harvests, and the United States in 1969 surpassed both Italy and Spain in almond shipments. That year, U.S. exports totaled 28,245 tons, or three and a half times greater than in the previous year.

This survey examines the almond industries of Spain and Italy in light of the changed competitive situation, as well as the potential competition to U.S. production and trade posed by these industries. It updates information presented in *The Almond Industry of Spain,* FAS M-165, July 1965, and *The Almond Industry of Italy,* FAS M-174, July 1966.

The author gratefully acknowledges the cooperation of Italian and Spanish Government officials, agricultural specialists, growers, and members of the processing industry, as well as the assistance of the U.S. Agricultural Attaché staffs in Rome and Madrid.

John W. Stewart
Director, Fruit and Vegetable Division

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The Almond Industries of Italy and Spain

By Theodore Horoschak
Fruit and Vegetable Division

PRESENT SITUATION

In 1969, the world almond trade underwent a major shift, as the United States–heretofore the third largest exporter–surged into first place on the wake of a bumper domestic crop and severely damaged crops in the Mediterranean Basin. Unfavorable weather that year had been hard on production in both Italy and Spain, and these traditional top exporters found their shipments reduced by 45 and 62 percent, respectively, while U.S. exports more than tripled. Although Mediterranean production and trade have since recovered, the new positions still hold and will probably continue to do so in the near future.

Italian almond production in the past tended to be cyclical in nature, with large year-to-year fluctuations. Recently, though, output seems to have stabilized in the upper levels of the production range. This has taken place despite the slow decline in almond acreage over the past decade. Commercial harvests averaged 38,800 short tons (shelled basis) in the most recent 5-year period (1966-70), as compared with 29,400 during 1956-60.

The country's almond exports have also demonstrated a slight upward trend over the past decade. However, future gains are unlikely until the Italians overcome the difficulty–aggravated by the numerous varieties of Italian almonds–of producing a uniform and consistent package at a reasonable price. Nurserymen and private growers have attempted to do this by importing improved foreign varieties, but the Italian Government has yet to permit their entry.

Helping to offset the lower exports has been a rise in domestic consumption. Almonds have traditionally been important in Italy as an ingredient in baked goods, and their use is expanding. In addition, a small market for consumer packs of salted and processed almonds is developing, with snack items being found in candy and variety shops.

The Italian trade is nonetheless attempting to maintain its competitive export position by emphasizing three advantages it feels it has over U.S. competitors: the distinct flavor of almonds grown in the Mediterranean Basin; the ability to make rapid delivery to any point in Europe; and Italy's exemption from custom duties in the other countries of the European Community (EC)–Belgium, Luxembourg, France, the Netherlands, and West Germany.

Spanish almond production, and acreage, by contrast, has shown a strong upward trend over the past 10 years. Production during 1966-70 averaged 34,200 tons, 13 percent above the 1961-65 average. A study recently released by the Spanish Government calls for an additional 74,000 acres to be planted in almonds by 1975. The Ministry of Agriculture is presently engaged in research to determine the most suitable locations for this new acreage. Improved varieties, many developed in California, are being evaluated by private nurseries and government experiment stations. Several are now under commercial cultivation.

Over the past 8 years, Spanish exports have also demonstrated a mild upward trend. Eastern Europe, with an improving standard of living, is looked upon as a strong potential outlet. To foster increased export sales, the Spanish Government offers a partial rebate of the export tax paid on overseas shipments. Since minimum volume regulations must be met if a firm is to qualify, the rebate has, in effect, encouraged the merger of small exporting firms, facilitating marketing.

As in Italy, Spanish exporters emphasize the distinct flavor of Mediterranean Basin almonds as well as the rapid delivery to any point in Europe.

Spain's domestic consumption of almonds has also risen sharply in recent years. Almonds and almond products are popular in confectionary and pastry products, nougat production, and as a snack item in bars and grills. The trade hopes to expand the market for small consumer packs of flavored and specialty items, not commonly found in Spain today.

As in the United States, the Italian and Spanish industries face rapidly rising costs. The trade, in an effort to offset these increasing costs, is turning to plant mechanization and automation. Modernization of the Italian trade has been severely hampered by the large number and small size of firms handling almonds. Most of the harvest is shelled and otherwise processed mechanically. However, it is not economically feasible for the small processors to adopt such recent innovations as electric eye sorters, bulk bin loaders, and automatic baggers. Spain, on the other hand, is modernizing rapidly. Recent mergers within the almond industry have enabled processing operations to be consolidated. Older, obsolete plants are currently being replaced by modern facilities. In Alicante, Spain, a plant incorporating machinery and techniques as modern as any found in the United States will begin operating with the 1971 harvest.

PROSPECTS

Commercial world almond production should continue to expand at a rapid pace, with harvests in excess of 215,000 short tons (kernel-weight basis) by 1975. Of this total, Italy, Spain, and the United States will account for 190,000 tons.

A Spanish crop in excess of 50,000 tons can be expected by 1975 as almond acreage continues to expand. Almost all new acreage will be of improved varieties desired in the export trade. Foreign shipments will continue their mild upward trend, totaling 32,000 tons by 1975, while most of the anticipated production increase will be absorbed through rising domestic consumption. Spanish officials feel per capita consumption will rise to 2.04 pounds in 1975, as compared with 1.72 pounds in 1968.

Conversely, Italian production has stabilized, and harvests should average 40,000 tons over the next 5 years. The increased production resulting from improved techniques and new plantings will be offset by extracted acreage and lower productivity of aged trees.

The mild upward trend recently demonstrated by Italian exports will be reversed, with exports declining slightly in the 1970's. The large number of varieties, coupled with rising processing costs, will make it difficult for the Italian shippers to present a uniform product at a competitive price. Exporters will continue to compete in all trade channels, by increasing competition from American and Spanish shippers will force the Italians to rely more upon the Common Market. For the immediate future, slowly rising domestic consumption is expected to offset the lower exports.

World demand for almonds will continue to increase, particularly in the confection trade. While kernel flavor is an important consideration in confectionary production, price is the dominant factor in the international almond market. California market quotations are now replacing the Italian Bari market as the international price standard.

Commercial Almond Production In selected countries[1]

[shelled basis]

Year	Iran	Italy	Morocco	Portugal	Spain	United States	Grand total
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Average:							
1935-39	7.5	31.8	2.8	3.0	23.1	7.4	75.6
1950-54	7.6	39.2	3.0	5.3	26.2	20.0	101.3
1952-56	6.6	30.2	2.2	4.8	21.2	21.7	86.7
Annual:							
1956	5.5	13.0	1.6	2.6	18.0	30.1	70.8
1957	11.0	51.0	2.0	4.3	32.0	18.1	118.4
1958	9.0	15.0	6.3	2.2	26.0	9.6	68.1
1959	10.0	49.0	3.6	3.3	32.0	42.1	140.0
1960	4.0	14.0	2.7	1.2	33.0	26.8	81.7
1961	9.0	66.0	4.0	5.8	35.0	35.7	155.5
1962	8.0	14.5	2.2	4.3	20.0	26.4	75.4
1963	5.5	42.0	3.1	2.0	31.0	33.7	117.3
1964	6.6	39.0	4.4	3.5	35.0	41.4	129.9
1965	6.6	41.0	6.6	4.4	30.0	39.4	128.0
1966	1.5	42.0	4.5	1.7	41.0	47.4	138.1
1967	6.0	43.0	5.5	6.0	30.0	41.1	131.6
1968	8.0	46.0	3.5	5.5	41.0	40.1	144.1
1969	6.0	24.0	3.0	2.4	24.0	64.2	123.6
1970[2]	11.0	39.0	3.0	6.0	35.0	70.4	164.4

[1] Estimated. [2] Preliminary.

With its high quality standards and consistent pricing policy, the United States should be able to maintain and enhance its ranking as the world's leading almond supplier.

Almond exports by selected countries

[shelled basis]

Year[1]	Iran	Italy	Morocco	Portugal	Spain	United States	Grand total
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Average:							
1935-39	4.6	29.4	1.5	2.7	24.1	--	62.3
1950-54	5.2	25.9	1.0	6.5	11.7	3.8	54.1
1957-61	5.1	29.7	3.1	2.9	26.9	5.1	72.8
Annual:							
1956	3.7	9.7	.8	3.3	6.6	6.9	31.0
1957	5.6	32.9	4.5	3.1	24.8	4.6	75.5
1958	5.4	14.5	2.9	2.3	14.8	1.0	40.9
1959	4.6	30.9	1.8	1.6	32.0	9.4	80.3
1960	2.9	22.5	2.9	2.5	29.0	5.6	65.4
1961	7.0	47.8	3.2	5.0	33.8	4.9	101.7
1962	6.6	19.9	.5	4.4	15.0	4.7	51.1
1963	1.8	34.5	1.4	2.8	23.1	9.5	73.1
1964	2.9	27.5	3.0	3.0	27.5	9.5	73.4
1965	2.5	30.2	5.0	3.3	24.2	11.3	76.5
1966	.6	34.9	3.0	1.4	32.4	10.2	82.5
1967	2.8	31.4	3.9	5.6	23.8	10.6	78.1
1968	5.5	35.1	2.5	4.6	27.8	8.8	84.3
1969[2]	3.0	19.2	2.0	2.0	10.5	28.2	64.9
1970[3]	7.0	26.0	3.0	5.5	20.0	30.0	91.5

[1] Year beginning September 1 for Spain, Portugal, and Italy; August 1 for the United States; September 23 for Iran; and July 1 for Morocco. [2] Preliminary. [3] Forecast.

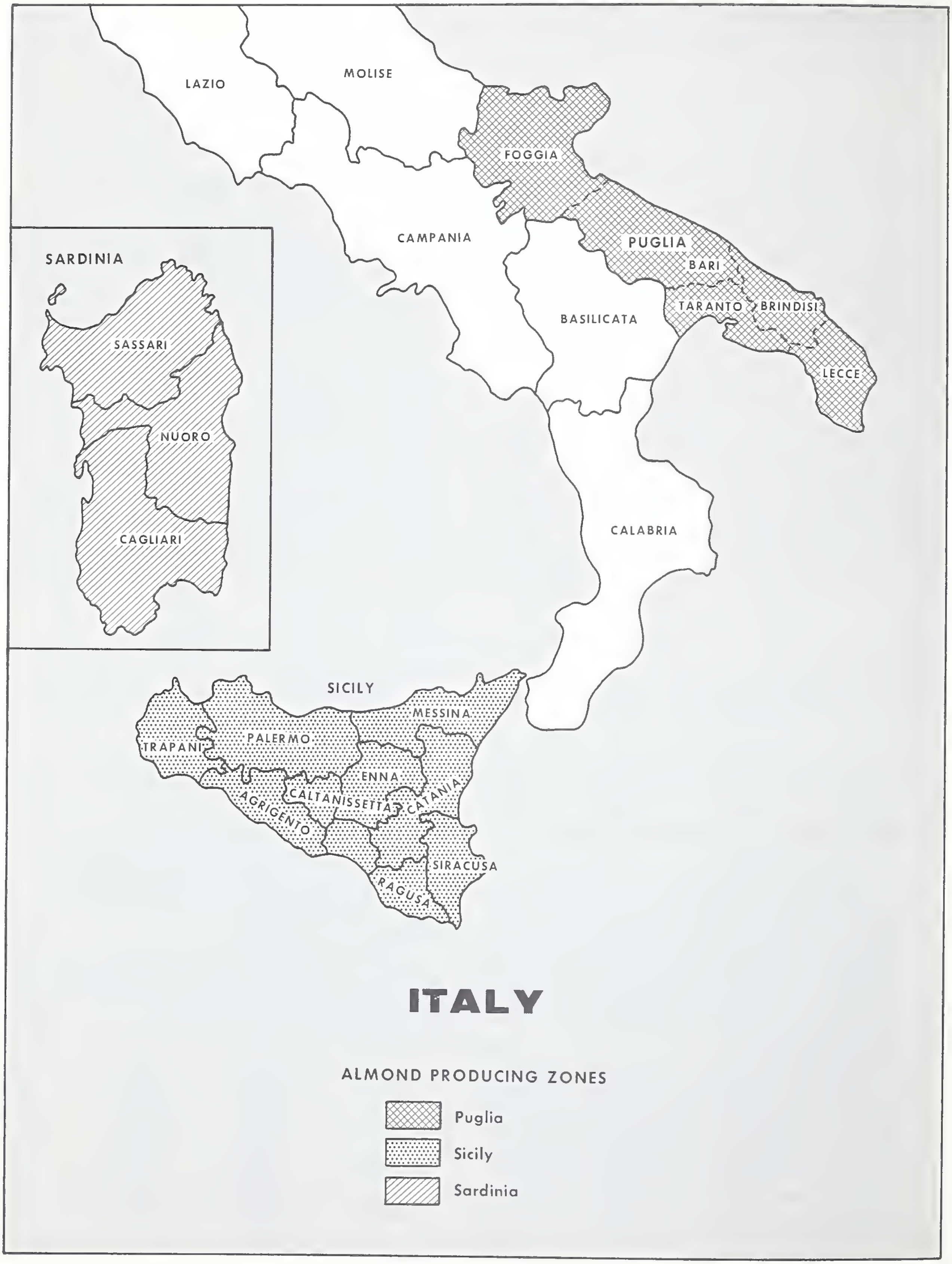
How production figures were derived

The production statistics in this report are not the official figures published by the Italian and Spanish Governments. The official figures cover total production, i.e., production in all Provinces (including those where almonds are not of commercial significance) and production in commercially inportant areas that does not enter marketing channels.

The figures presented are estimates of commercial production derived by the Foreign Agriculture Service, U.S. Department of Agriculture. They are based on estimates made by representatives of the almond industry in Italy, Spain, and other nations; reports prepared by the U.S. Agricultural Attachés and Foreign Service Officers stationed in Spain and Italy; statistics prepared by the respective governments; and research performed by the Fruit and Vegetable Division, FAS. These estimates are in terms of shelled almonds. Official statistics are in terms of in-shell almonds.

Production figures furnished by the Spanish Ministry of Agriculture and the Italian Istituto Centrale di Statistica are shown below:

	Italy	Spain
	Short tons	*Short tons*
1969	211,500	119,900
1968	325,000	168,100
1967	270,500	134,100
1966	261,000	170,900


LAZIO
MOLISE
FOGGIA
CAMPANIA
PUGLIA
BARI
TARANTO
BRINDISI
BASILICATA
LECCE
CALABRIA
SARDINIA
SASSARI
NUORO
CAGLIARI
SICILY
MESSINA
PALERMO
TRAPANI
ENNA
CALTANISSETTA
CATANIA
AGRIGENTO
SIRACUSA
RAGUSA
ITALY
ALMOND PRODUCING ZONES
Puglia
Sicily
Sardinia

THE ALMOND INDUSTRY OF ITALY

Marketing

The Italian almond industry has undergone little change during the past 5 years. Approximately 20 large firms are engaged in the export trade, with half of these accounting for the bulk of overseas shipments. Supplementing these firms are numerous small agencies who export on occasion, their participation and volume dependent upon market conditions.

Unlike their Spanish counterparts, Italian exporters usually carry uncommitted inventory, easing their dependence upon speculators for supplies. A few of the large firms have incorporated cold storage facilities into their operations. The practice of maintaining uncommitted stocks enables Italian exporters to exploit the market in times of short supplies. And if the stocks do not draw a high enough price, they can be carried over into the next season. The tight market situation encountered in the fall of 1970, prior to the harvest of the 1970 crop, provided an excellent example of this situation. Following the poor 1969 harvest, available stocks were extremely low and high prices prevailed as buyers bid against one another for the available quantities. Prices rose to over $1.10 per pound in August 1970, only to fall below 70 cents by January 1971 with the availability of the 1970 harvest.

Forward sales are another important aspect of the Italian trade. This is a highly speculative activity, whose outcome hinges upon the accuracy of the exporters preharvest estimates. If the estimate is low, and growers prices lower than expected, the shipper can make a large profit. If, on the other hand, his estimate is high, severe losses can be incurred.

Government policies

Almond production is primarily located in southern Italy, economically the nation's poorest region. The Italian Government is presently involved in an effort to attract industry to this area and open new land to cultivation. Two projects of paramount concern to these goals are a highway system linking southern Italy to the north (comparable to the interstate system under construction in the United States) and a vast irrigation system throughout southern Italy. At the present time, little if any almond acreage is irrigated. One possible short-range effect of the irrigation project is the removal of almond acreage and its replacement by citrus or other alternate crops. However, as time passes and more water becomes available, irrigation of almond acreage might occur.

The Ministry of Agriculture recently phased out extension-service research projects concerning almond cultivation. At present, no further government-sponsored research is scheduled. And though numerous private nurserymen and producers have attempted to import new and improved varieties, the government has yet to permit their entry.

Italy, as a charter member of the European Community, is exempted from the 7-percent duty on almonds imported by fellow EC members. In addition, the EC pays shippers a subsidy on all almonds exported to nonmember (third) countries. Currently, this subsidy is set at 1.81 cents per pound for shelled almonds.

Production and acreage

Italy's commercial production tends to be concentrated near the "heel" in southern Italy. This area, accounting for approximately 95 percent of Italy's commercial harvest, is divided into three regions: Puglia, Sicily, and Sardinia.

The Puglia region, accounting for 40 percent of the harvest, is comprised of five Provinces: Bari, Brindisi, Foggia, Lecce, and Taranto. Bari is by far the most important almond-producing Province in Italy, contributing 25 percent of the harvest. Until recently, price quotations on the Bari market were looked upon as the international price standards.

The island of Sicily, located off the "toe" of the boot, produces approximately half of Italy's commercial crop. All nine Provinces of Sicily are important almond regions. The Provinces are: Agrigento, Caltanissetta, Catania, Enna, Messina, Palermo, Ragusa, Siracusa, and Trapani.

The island of Sardinia is located in the Mediterranean, due west of Naples. Approximately 5 percent of Italy's crop is produced here. Cagliari, Nuoro, and Sassari are Sardinia's three Provinces.

Historically, Italian production has tended to be cyclical in nature, with large year-to-year fluctuations. In recent years, however, production seems to have stabilized in the 40,000-ton range. This has occurred despite the slow, steady decline in acreage over the past 10 years.

Although severely damaged by frost, commercial production totaled 24,000 tons in 1969, and averaged 38,800 tons for the most recent 5-year period (1965-69). This compares with the 1956-60 average of 29,400 tons. Preliminary estimates place the 1970 harvest at 39,000 tons.

In 1969 plantings totaled 1,416,900 acres, 9 percent below the 1960 total. Of this, 1,025,700 acres were in mixed plantings and 391,200 in specialized acreage.

Italy's supply and distribution of almonds
[shelled basis]

Item	Average 1960-64	Year beginning September 1						
		1964	1965	1966	1967	1968	1969[1]	1970[2]
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Beginning stocks....	5.9	1.5	6.5	3.0	2.0	4.0	4.0	1.0
Production	35.1	39.0	41.0	42.0	43.0	46.0	24.0	39.0
Imports	0.2	0.2	0.2	0.1	0.3	0.3	1.0	0.5
Total supply	41.2	40.7	47.7	45.1	45.3	50.3	29.0	40.5
Exports	30.5	27.5	30.2	34.9	31.4	35.1	19.2	26.0
Domestic consumption	6.7	6.7	14.5	8.2	9.9	11.2	8.8	12.5
Ending stocks......	4.0	6.5	3.0	2.0	4.0	4.0	1.0	2.0
Total distribution .	41.2	40.7	47.7	45.1	45.3	50.3	29.0	40.5

[1] Preliminary. [2] Estimated.

FAS/USDA estimates except for export data.

Italian almond acreage, selected years

Province and region	1960		1965		1967		1969	
	Specialized	Mixed	Specialized	Mixed	Specialized	Mixed	Specialized	Mixed
Puglia:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Bari	129.2	409.4	126.2	406.1	125.8	405.2	125.0	404.0
Brindisi	6.2	97.9	5.3	96.3	5.4	95.6	5.7	94.1
Foggia	3.5	20.8	3.3	19.8	3.2	19.5	3.6	19.5
Lecce..........	–	4.2	.1	3.1	–	2.7	–	2.7
Taranto	16.3	28.9	15.1	27.7	15.1	26.4	14.1	25.0
Total	155.2	561.2	150.0	553.0	149.7	549.8	148.3	545.6
Sicily:								
Agrigento	84.8	34.8	84.2	28.8	82.5	27.9	82.0	27.4
Caltanissetta......	32.1	80.1	32.1	80.1	32.1	80.1	32.1	80.1
Catania	15.6	186.3	12.4	158.6	11.6	153.2	10.9	145.0
Enna..........	40.0	8.4	40.1	8.6	40.0	8.6	39.3	8.6
Messina	4.2	1.5	4.1	4.4	4.0	4.4	4.0	4.4
Palermo	4.0	18.3	4.0	18.4	4.0	18.3	4.0	18.3
Ragusa	8.4	63.3	8.3	64.0	9.1	63.8	9.1	63.8
Siracusa	48.2	10.4	48.3	12.7	43.0	12.8	43.0	12.8
Trapani	5.4	17.3	5.5	17.3	5.4	17.3	5.4	17.3
Total	242.7	420.3	234.5	392.9	232.3	387.0	230.8	378.1
Sardinia:								
Cagliari	15.3	33.6	11.3	32.5	8.2	24.5	7.7	21.0
Nuoro	2.5	13.1	2.2	11.4	2.2	9.9	2.2	9.9
Sassari.........	–	1.0	.1	1.0	–	.7	–	.7
Total	17.8	47.7	13.6	44.9	10.4	35.1	9.9	31.6
Other Provinces	4.2	100.1	3.9	83.3	3.7	81.5	2.2	70.4
Grand total...	419.9	1,129.3	402.0	1,074.1	396.1	1,053.4	391.2	1,025.7

Istituto Centrale di Statistica, Rome.

Both mixed and specialized plantings declined, with acreage losses occuring in all three regions. Much of the "lost" acreage has been replaced by table grapes and citrus plantings. This decline is expected to continue, as almond plantings are replaced by more profitable crops.

Despite the continued decline in acreage, production is expected to remain in the 40,000-ton range over the next 5 years. New plantings, composed of selected varieties and receiving advanced cultural care, will help to stabilize production. However, the production gains arising from the new plantings will be offset by the losses due to lower productivity of older trees and pulled plantings.

Varieties

The Italian trade has identified some 1,200 varieties of almonds. Sweet varieties predominate, although some bitters are produced. The varieties raised in Sicily and Puglia differ sharply, while in Sardinia there is no substantial production of any one variety or type.

Sweet Sicilian almonds, primarily hard shelled, are classified[1] as follows by the Italian trade:

- "Choice Avola" (Avola scelta) is the trade designation mainly for kernels of the variety "Pizzuta d'Avola," which is grown chiefly in the Provinces of Siracusa and Ragusa; it is grown for export, commands a high price, and is highly desired by confectionary manufacturers.
- "Common Avola" (Avola corrente) is the trade designation for kernels of the variety "Romano," also grown mainly in Siracusa and Ragusa. It is also for export but is priced as a common variety and often mixed with other common varieties and exported under the trade name "Palma-Girgenti."
- "Fascionello" is the trade term for kernels of the variety Fasciuneddu, also grown in Siracusa and Ragusa. (These two Provinces are renowned for superior varieties.) When sorted and graded by the same criteria as "Choice Avola," it may be marketed as a "Choice Avola." It thus commands a higher price than common types. It may, however, be graded less rigorously and shipped under the "Palma-Girgenti" category.
- "Nostra contrada" (meaning "our region's almonds"), also known as Etna almonds, is grown in a limited area near Mount Etna and when mixed (in variable proportions) with other varieties is exported under the classification "Palma-Girgenti."
- "Cuore," or "Heart" consists of the kernels of the Cuva variety and occurs mainly in some communities in Catania. It is marketed largely for export.
- "Similarianostra contrada" (meaning "similar to our region's almonds") is a broad category consisting of various varieties cultivated in a large part of the Province of Catania and in some communities of Etna and Messina. The kernels are less uniform than the Etna (Nostra contrada) type. They may be mixed in varying proportions with other types under the designation "Palma-Girgenti" and thus exported.
- "Palma-Girgenti" is the name of a very broad grouping under which a portion of some of the types described and the many other Sicilian almond varieties—grown anywhere in Sicily—are traded. "Twins" of well-known varieties are also included. "Palma-Girgenti" accounts for 60-65 percent of Sicily kernel production.

A rough breakdown, according to Italian almond specialists, of Sicily's kernel varieties (as a percent of value) is as follows:

	Percent
Avola scelta, Avola corrente, and Facionello	20
Etna or Nostra contrada and similar	18
Cuore	2
Palma-Girgenti	40
	100

The leading in-shell varieties grown in Sicily are the Mollese di Niscemi, which has a soft shell and is exported largely to France and Germany, and the Fellamasa, a semihard-shell variety which is exported also. Two other soft-shell varieties are the Cavalera and the Regina.

In Puglia, the most valued varieties are the Santora, Fragiulia, and Tuono, all with a semihard shell, and the Rachele and Montrone, with a hard shell. Santora and Fraguilia are highly regarded in the export trade. By far the bulk of Puglia's production is designated under the trade name, "Prima Bari." This is simply a conglomeration of varieties grown in the Puglia area, much as "Palma-Girgenti" is for Sicily. The Ladonia is the leading soft-shell variety in Puglia.

In Sardinia there is no substantial production of any variety of merit. As a result, Sardinian production comprises a mixture of unspecified varieties which are sold to Sicilian firms and mixed with Sicilian almonds under the "Palma-Girgenti" designation.

Italian almonds, being predominantly hard shelled, have a relatively low yield of kernels upon shelling. The trade in Italy believes that the average shell-out is slightly in excess of 20 percent. This, of course, refers to shelling varieties which account for the overwhelming share of Italy's production and trade. Soft-shell varieties have a much higher shelling yield, approaching 50 percent. Yields of the main Sicilian varieties have been estimated[2] as follows:

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[1] Francaviglia, G. *Tecnica Agricola,* Anno X, No. 1-2, 1958. Catania, Sicily.

	Percent
Hard-shell varieties:	
Pizzuta (Choice Avola)	21
Romano (Common Avola)	20
Fasciunddee (Fascionello)	22-23
Cuore	20-26
Semihard-shell varieties:	
Fellamasa	35-36
Bottara	35-36
Soft-shell varieties:	
Mollese di Niscemi	45-55
Cavalere (Mollese)	45-48
Regina (Mollese)	47-50

Cultural practices

Italian farmers, as do most Mediterranean producers, hold the belief that almonds yield a return on poor land that would not sustain any other crop (olives and carobs excluded). Thus, almonds have been planted in the most undesirable locations and receive little, if any, care. There has been only minimal usage of fertilizers and pesticides and almost no utilization of modern cultural techniques. Today, a few progressive growers are adopting advanced cultural techniques developed in Italy and abroad, although this tends to be confined to specialized or new acreage.

Seedlings and rootstocks.—As in Spain, the bitter almond is used almost exclusively for rootstocks. Historically farmers have grown their own seedlings; today, seedlings, in limited quantities, are available from commercial nurseries.

Pruning.—Except on the more progressive farms, pruning is performed at the discretion of the individual farmer, most commonly on a biennial basis. Young trees are trained to two or three main branches, shaping the tree to an open form. On older trees, pruning consists of the removal of dead or diseased wood and crossing branches. Aged trees are often severely cut back to stimulate new growth.

Cultivation and intercropping.—In specialized plantings, the soil is clean-cultivated and smoothed. Two or three cultivations are common—once in the spring shortly before harvest, and occasionally in the fall following harvest. In parts of Sicily, four and five cultivations are common on the specialized acreage. Plantings are intercropped intensively. Intercropping often embodies rotation of small grains, legumes, and fallow in areas where moisture is scarce. In the Bari region, intercropping with grapes is widely practiced. Another form of mixed plantings involves alternating almond and olive trees in an orchard.

Irrigation.—Little, if any, almond acreage is irrigated. Since water is scarce, irrigation is reserved for higher value crops, such as citrus, table grapes, and annual vegetables. As the current irrigation project is expanded, however, irrigation of almond acreage may increase.

Fertilization.—Use of commercial fertilizers has increased in recent years. In the past, manure was the only fertilizer used. Today, a small portion of the growers are applying commercially prepared fertilizers. Preparations used include muriate of potash, and superphosphate. Application generally occurs in the fall following harvest.

Spraying.—The small size of most plantings make the use of commercial fungicides and insecticides uneconomical.

Harvesting.—The harvesting period extends from July to October. Sicily is usually the earliest area, followed by Puglia and Sardinia. Mechanical harvesting is not widespread in Italy, though several of the larger growers are now adopting it. Rough terrain, intercropping, and small holdings are all factors contributing to the lack of mechanical harvesting. Generally, nuts are knocked from the trees with a stick and gathered by hand. In some areas, a cart with cloth frames on three sides is drawn under the tree, from which almonds are then knocked with a long pole.

Farm labor.—Production is accomplished with a minimum of hired labor. Generally, the farm operator and his family provide the labor required. Larger units may hire full-time employees or part-time workers during the harvest season. In the past, cheap labor was abundant, but recently wage rates have increased sharply as industry has moved in and the population has migrated to the industrial centers of Europe and northern Italy.

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[2] Ibid.

Annual gross minimum contract wages of regular farm workers in Sicily and Puglia, 1967-68[1]

Region and province	Specialty	Annual wage	
		Total pay	Value of pay in kind[2]
Sicily:		*U.S. dol. equiv.*	*U.S. dol. equiv.*
Messina	Field Worker	750	179
Trapani	Foreman	1,159	19
Enna	Ox Driver	962	253
Catania	Manager	1,253	395
Agrigento	Field Worker	830	75
Caltanissetta	Manager	1,150	50
Siracusa	Ox Driver	1,216	92
Ragusa	Manager	1,256	--
Puglia:			
Taranto	Ordinary farm hand	1,094	96
Lecce	Plowman	1,179	144
Foggia	Ordinary farm hand	1,310	40

[1] Converted at 625 lire per U.S. $1.00. [2] Value of payments in kind is based upon prices of commodities in each province.

Annuario di Statistica Italiano 1969, Istituto Centrale di Statistica.

Processing

The majority of growers possess hulling equipment. For those who do not, machinery is available in most villages for custom service. After hulling and sun drying, the almonds are stored on the farm until sold. In recent years, the prices received by producers have leveled off, following a sharp upward trend in the early 1960's. And though producer prices rose sharply during the 1969-70 marketing season (as a result of the poor crop that year), they have demonstrated a marked decline during the 1970-71 season following the recovery in production. The trade believes that prices will remain static, or possibly even drop, as world supplies expand. At present, there is little or no contract buying.

Small cracking (shelling) plants, accumulator-speculators, and agents of the packer-exporters all vie for the available supplies. Agents of the packer-exporters also purchase almonds from cracking plants and accumulator-speculators—particularly from small firms located in the production areas. Almonds purchased from shellers have, obviously, been shelled, while those obtained from accumulator-speculators might be shelled or inshell. Shelled almonds have been sorted roughly as to size and grade prior to delivery to the packer-exporter. In-shell almonds usually arrive at the processors in burlap bags, separated by category and variety.

The nuts are passed through cracking machines, screened and separated from the shells, and possibly sized at this time. The kernels are then given a final grading, usually done by a crew of women who sort and grade the kernels as they pass on a conveyor belt.

Following the final sorting, the almonds are either blanched or immediately packed for shipment (domestic and/or export). Blanching is not performed as often in Italy as in Spain or the United States. For export, almonds are packed in wooden boxes containing up to 50 kilograms (110 lb.), in 50-kilogram burlap sacks, and in cardboard boxes holding up to 12.5 kilograms (27.5 lb.). The cardboard boxes, lined with plastic, are used mainly for higher priced varieties or processed kernels. Plastic liners are also used in burlap sacks.

Processing technology has advanced tremendously during the past decade. Most shelling operations have been mechanized, as have the screening and sizing operations. Today, processors are remodeling and replacing older facilities in an effort to offset rising processing and labor costs.

Average monthly prices received by Italian almond producers[1]

[In-shell basis]

Area and type	1965-66	1966-67	1967-68	1968-69	1969-70
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*
Bari–first quality:					
September	15.0	14.3	14.5	14.3	23.4
October	14.8	14.1	14.5	14.9	23.6
November	14.8	14.2	14.8	15.2	23.3
December	15.0	14.4	15.8	15.4	23.3
January	15.2	14.7	16.1	15.6	23.2
February	15.1	14.6	15.8	15.6	21.5
March	15.0	14.4	15.9	15.6	21.0
April	15.1	14.5	16.0	16.8	19.6
Catania–hard kernels:					
September	(2)	10.5	12.0	11.7	(2)
October	(2)	11.4	12.3	11.9	(2)
November	(2)	11.5	12.3	12.3	(2)
December	(2)	11.8	13.2	12.5	(2)
January	(2)	11.8	13.4	12.6	(2)
February	(2)	11.9	13.0	12.6	(2)
March	(2)	11.7	13.0	12.6	(2)
April	(2)	12.0	13.1	13.6	(2)

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[1] Prices drawn by Local Chamber of Commerce and elaborated Central Institute of Statistics converted at 625 lire to the dollar. [2] Not available.

Italian money wage indexes

[Family allowances not included]

Calendar year	Agricultural workers	Industry		Trade		Transport		Government clerks
		Workers	Clerks	Workers	Clerks	Workers	Clerks	
	1953 = base[1]							
1954	104.2	103.7	103.9	102.2	102.7	101.2	–	100.2
1955	108.9	108.6	110.9	105.3	106.1	106.8	–	111.8
1956	113.7	114.9	118.4	112.8	115.1	113.6	–	120.0
1957	117.3	120.1	124.2	118.4	121.8	117.5	–	126.3
1958	123.3	126.4	130.5	125.1	128.6	122.4	–	126.3
1959	125.8	127.9	132.8	129.1	133.0	129.9	–	128.8
1960	127.0	133.9	138.4	132.6	137.0	130.4	–	131.3
1961	133.3	139.5	144.0	139.5	144.7	140.5	–	132.2
1962	153.3	155.2	157.2	148.2	154.4	157.1	–	155.1
1963	186.0	177.4	187.5	167.4	179.2	169.8	–	202.7
1964	212.7	208.4	213.9	188.1	204.5	200.2	–	212.5
1965	231.2	225.7	229.8	208.1	226.3	211.5	–	223.6
1966	245.2	234.0	238.5	215.9	236.8	217.3	–	235.1
1967	257.0	247.1	250.5	222.6	244.1	220.8	–	240.0
	1966 = base[2]							
1967	109.2	105.0	105.1	102.7	102.7	102.3	102.4	101.8
1968	114.8	109.0	108.3	107.6	107.4	105.9	105.7	105.0
1969	127.2	117.0	113.9	113.2	113.3	111.3	110.7	108.8

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[1] As elaborated by the Embassy from the original ISTAT base 1938 =1. These indexes are based on minimum gross contractual rates. They do not include the 13th-month pay (Christmas bonus), overtime and other nonrecurrent allowances; therefore, they do not represent de facto earnings of the categories of people under examination. [2] New ISTAT series starting January 1967. The new index differs from the old one chiefly because it reflects, inter alia, such changes – not affecting the "take home" pay – as may occur in the number of working hours, annual leave days, and holidays. Also, it includes the 13th-month pay (Christmas bonus).

Istituto Centrale di Statistica.

Domestic consumption

In recent years, Italian consumption has risen substantially. Although reliable data are not available, domestic consumption is believed to have averaged about 10,300 tons over the 1965-69 period. This compares with 8,300 tons during 1962-66 and approximately 7,000 in 1957-61. This growth is expected to continue, with domestic utilization totaling 11,500 tons during the 1970-71 season.

Rising incomes and an improving standard of living are credited with stimulating consumer demand. In 1968, disposable per capita income totaled $1,071, approximately 80 percent above the 1961 level of $586.

The confectionary industry is the largest user of almonds, accounting for over 85 percent of domestic utilization. Major uses include: confetti (sugar-coated almonds), pastry and baked goods in general, candy, and ice cream. A small market for individual consumer-sized packets of salted and processed almonds is being developed.

Foreign trade

Foreign shipments continue to be the major outlet of Italian production, accounting for 80 percent of the commercial harvest. The mild upward trend recently demonstrated in overseas shipments is expected to be reversed, with exports declining slightly during the 1970's.

European nations continue to take the lion's share of Italian exports. However, trade patterns have been altered significantly by the preferential tariffs of the European Community. During the most recent 5-year period (1965-69), shipments to fellow EC members accounted for 74 percent of the seasonal exports. This compares with 68 percent for the 1961-65 marketing seasons and 54 percent during 1955-59. During 1969-70, EC members took 79 percent of the Italian exports.

The format of Italian trade statistics has recently been revised, precluding analysis of exports on a destination basis. However, available import statistics reveal the following:

- Shipments to the United Kingdom, formerly one of Italy's largest markets, have virtually ceased;
- Switzerland has increased its purchases of Spanish nuts, at the expense of the Italians;
- Swedish imports of Italian nuts have dropped sharply in the past decade (from 3,750 tons in 1961-62 to 335 tons in 1968-69).

The Italian almond undustry concedes that its dependence upon the EC as an outlet for its product will increase. Despite this, the Italians intend to compete aggressively in all available markets in an effort to expand sales.

Italian almond exports

[shelled basis]

Country of destination	Year beginning September 1					
	Average 1961-65	1965	1966	1967	1968	1969
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
United States	10	–	–	–	–	–
European Community:						
Belgium-Luxembourg	781	1,255	707	–	–	–
France	3,510	4,294	6,710	5,718	6,601	3,670
West Germany	14,247	13,666	14,446	14,088	17,847	8,500
Netherlands	3,102	2,946	2,924	2,900	2,065	3,068
Total EC	21,641	22,161	24,787	22,706	26,513	15,238
Other Europe	6,415	1,240	2,318	2,486	[1]	[1]
Total Europe	28,056	23,401	27,105	25,264	[1]	[1]
USSR	402	1,020	1,595	1,321	893	–
Other	3,506	5,759	6,217	4,785	7,686	83
Total	31,975	30,180	34,917	31,370	35,092	19,221

[1] Not available.

Statistica del Commercio con L'esto.

Italian almond export quotations, cost and freight the United Kingdom

Year	Italian Sweet Cleaned P.G.'s											
	July	August	September	October	November	December	January	February	March	April	May	June
	Cents per lb.	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
1959-60 . .	45.0	43.1	42.5	41.9	41.9	43.1	45.0	45.6	45.2	41.9	43.8	45.0
1960-61 . .	44.0	47.5	51.9	51.2	51.2	48.8	51.0	51.2	47.0	46.2	46.2	48.7
1961-62 . .	49.4	44.4	44.4	42.5	43.7	46.2	49.4	50.6	50.0	65.0	65.0	69.4
1962-63 . .	66.9	65.0	70.6	73.7	77.5	75.6	75.6	73.1	70.0	63.7	67.5	68.1
1963-64 . .	68.1	66.2	67.5	73.7	73.7	68.1	71.2	70.6	68.7	66.9	68.7	71.2
1964-65 . .	71.9	71.9	70.6	66.2	66.2	65.6	66.2	65.6	66.2	64.4	65.0	67.5
1965-66 . .	68.7	71.2	70.0	66.9	65.6	66.9	66.9	66.9	67.5	66.5	66.9	68.7
1966-67 . .	68.1	66.9	66.2	63.1	63.1	63.7	64.6	64.4	64.4	64.4	65.6	66.2
1967-68 . .	68.7	67.2	66.9	66.2	66.2	67.5	69.6	70.7	69.6	69.1	69.6	68.6
1968-69 . .	66.4	66.4	64.5	64.8	68.6	67.5	69.6	69.1	68.6	69.6	81.4	82.5
1969-70 . .	80.9	85.2	97.5	101.2	101.8	102.9	101.8	92.4	94.8	([1])	([1])	([1])

[1] Not available.

Gill and Duffus, *Edible Nut Statistics,* March 1970.

THE ALMOND INDUSTRY OF SPAIN

Marketing structure

Tremendous advances have been made by the Spanish almond trade during the past 5 years. While the most important changes have occurred in the marketing and processing segments of the industry, cultural techniques have advanced also.

In recent years, the number of packer-exporters has declined sharply while an increase in plant size has been observed. Strapped with rapidly rising processing costs and increased tonnage, small processors have had to modernize their facilities to operate profitably. In an effort to obtain the capital required to finance these improvements, mergers were undertaken or associations formed.

Consolidation has already resulted in more efficient marketing of the larger crops. Previously, foreign buyers would pit one exporter against another in an attempt to obtain lower prices. Today firms are not at the mercy of a single buyer, and owing to decreased costs, the companies are able to expand their markets.

As the new firms replace older, outdated processing facilities, product standardization will improve. Now under construction are several processing plants which, when finished, will be as modern as any found in the United States.

Government policies

Currently, exporters received a partial rebate of the 5.6-percent export tax on foreign shipments. To qualify for this rebate, the exporting firms must meet minimum volume regulations. These regulations have encouraged consolidation within the trade. The rebate amounts to 5.2 percent of the 5.6-percent tax. (Thus, in effect, the exporter pays only 0.4 percent). Four percent of the rebate is to be used for plant and equipment improvement, with the remaining 1.2 percent being for the exporter's own use.

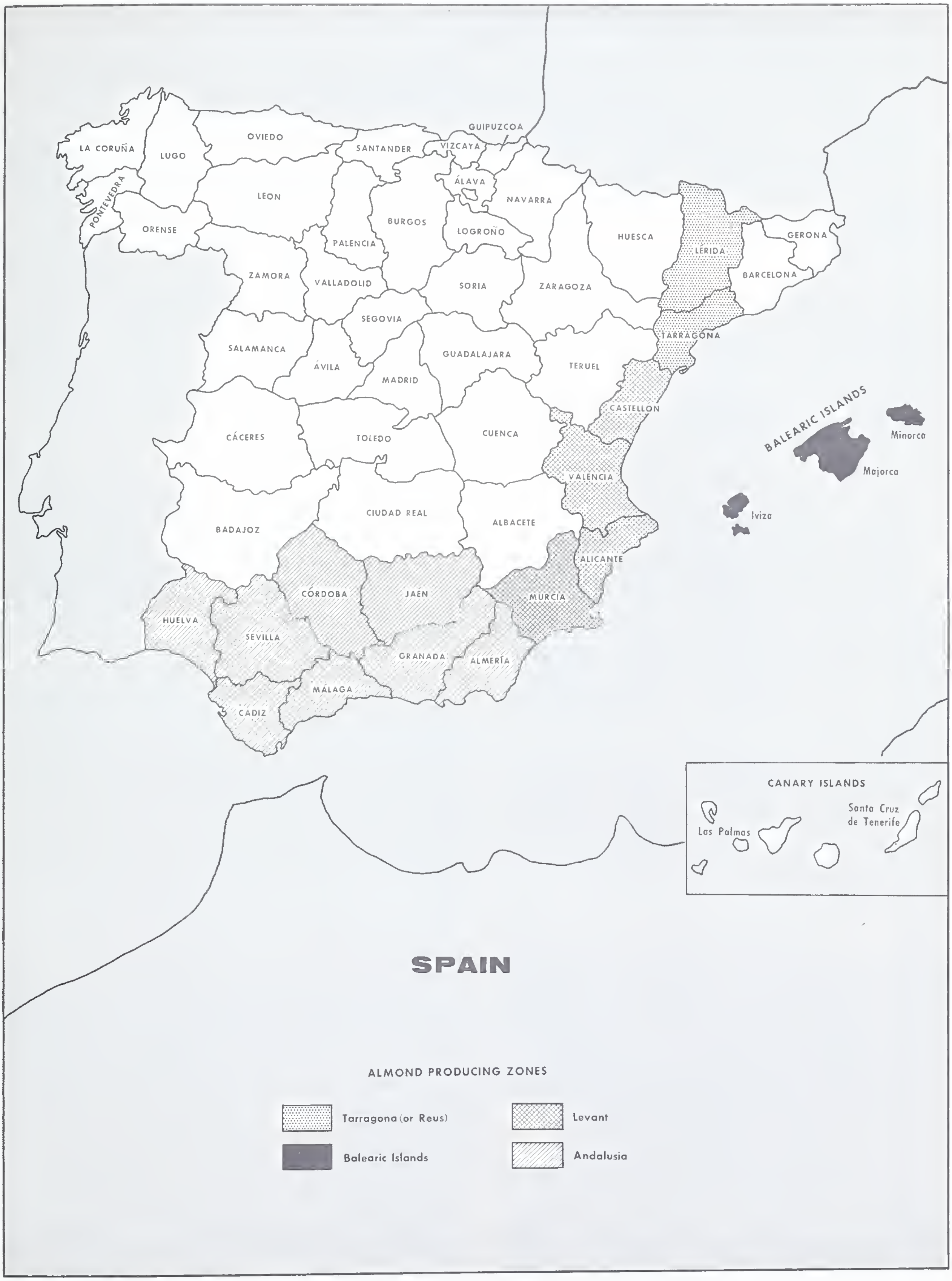
Compulsory export standards for shelled and unshelled almonds, established in 1963, are still in effect. The Inspection Service of the Ministry of Commerce (SOIVRE) is responsible for enforcing these standards. In 1967, the Ministry of Agriculture established compulsory fumigation for shelled and/or unshelled almonds and filberts exported during May through October of each year, the purpose being to destroy the almond moth (Ephestia Huchniella Zell) and other insects. Methyl bromide is used as the fumigating agent.

In 1969, the standards were again amended to allow for the exportation of bits and pieces under 5 millimeters in size. Tolerances of 3 percent inedible pieces and 40 percent larger sizes (not to exceed 8 millimeters) were established.

Production and acreage

While almonds are grown throughout most of Spain, commercial production is concentrated in those Provinces adjacent to the Mediterranean Sea. Commercial acreage extends from the base of the Pyrenees Mountains in northeastern Spain to the Portuguese border in the southwest. The Balearic Islands, off Spain's eastern coast, are included within this area.

Spain's commercial almond-producing area is usually considered divided into four regions, or zones: Tar-


LA CORUÑA
LUGO
OVIEDO
SANTANDER
GUIPUZCOA
VIZCAYA
ÁLAVA
NAVARRA
PONTEVEDRA
LEON
BURGOS
LOGROÑO
ORENSE
PALENCIA
HUESCA
LERIDA
GERONA
BARCELONA
ZAMORA
VALLADOLID
SORIA
ZARAGOZA
SEGOVIA
TARRAGONA
SALAMANCA
ÁVILA
GUADALAJARA
TERUEL
MADRID
CASTELLON
BALEARIC ISLANDS
Minorca
Majorca
Iviza
CÁCERES
TOLEDO
CUENCA
VALENCIA
CIUDAD REAL
ALBACETE
BADAJOZ
ALICANTE
CÓRDOBA
JAÉN
MURCIA
HUELVA
SEVILLA
GRANADA
ALMERÍA
MÁLAGA
CADIZ
CANARY ISLANDS
Las Palmas
Santa Cruz de Tenerife
SPAIN
ALMOND PRODUCING ZONES
Tarragona (or Reus)
Levant
Balearic Islands
Andalusia

Spain's supply and distribution of almonds

[Shelled basis]

Item	Year beginning September 1						
	Average 1960-64	1965	1966	1967	1968	1969[1]	1970[2]
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Beginning stocks	3.6	2.0	1.0	2.0	2.0	4.0	4.0
Production	30.8	30.0	41.0	30.0	41.0	24.0	35.0
Total supply	34.4	32.0	42.0	32.0	43.0	28.0	39.0
Exports	25.7	24.2	32.4	23.8	27.8	14.3	20.0
Domestic consumption	6.1	6.8	7.6	6.2	11.2	9.7	14.0
Ending stocks	2.6	1.0	2.0	2.0	4.0	4.0	5.0
Total distribution	34.4	32.0	42.0	32.0	43.0	28.0	39.0

[1] Preliminary. [2] Forecast.

Spain's almond acreage

Year	Dry	Irrigated	Total
Harvested acreage:	*Acres*	*Acres*	*Acres*
1964	512,577	23,719	536,296
1965	508,485	23,474	531,959
1966	497,914	22,820	520,734
1967	496,029	22,029	518,058
1968	527,074	23,502	550,576
Planted acreage:			
1964	564,890	24,646	589,536
1965	568,644	24,791	593,435
1966	574,626	24,715	599,341
1967	586,210	24,688	610,898
1968	599,576	24,601	624,177

Production – Demanda de Almendra en 1975, Spanish Ministry of Agriculture, 1970.

rangona, the Balearic Islands, Levant, and Andalusia. These zones, accounting for 95 percent of the commercial crop, are not precisely defined. Rather, they are based on traditional trade patterns and similarities in climate, varieties grown, and production procedures.

The Tarragona region, or Reus as it is sometimes called, in the northwest, consists of two Provinces–Lérida and Tarragona. Production in this zone contributes 20 percent of Spain's commercial harvests.

The Balearic Islands, to the east and south, is the next region. Approximately 15 percent of the crop is harvested here.

Continuing southward, the next region is Levant. This region, accounting for 45 percent of the commercial harvest, is comprised of four Provinces–Alicante, Murcia, Valencia, and Castellon.

The fourth producing region is Andalusia, in southern Spain. Approximately 20 percent of the commercial crop is produced here. The eight Provinces of Andalusia are Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga, and Sevilla.

Production during the past 20 years has shown a strong upward trend, contrasted with its rather static (23,000-ton-a-year average) up until the mid-1950's. Output hit a high of 41,000 short tons (shelled basis) in both 1966 and 1968 and averaged 33,200 tons during 1965-69. Even the frost-damaged harvest of 1970 reached 35,000 tons.

Increased acreage and improved cultural practices contributed to the enlarged output and will help bring further expansion, to more than 50,000 tons by 1975.

During the 1964 season, 589,000 acres were under almonds. Of this total, 536,000 acres were harvested. By the 1968 season, plantings totaled 624,000 acres with 550,000 being harvested. In terms of acreage, the Levant region is the largest, followed by the Balearic Islands, Andalusia, and Tarragona. The following table presents acreage and yield data for the 1967 season. (Although statistics are available for earlier years, it is considered inadvisable to make comparisons due to revisions in the data format.)

Acreage expansion is expected to continue. Alicante Province, located in the Levant region, is an outstanding example of this growth. From 89,000 acres in 1967, Alicante acreage had risen to 94,500 by May 1969 for an increase of 6 percent. Though only a small percentage of

Spanish almond acreage and yield by selected zones and provinces, 1967

Zone and province	Plantings[1]			Yield	
	Dry	Irrigated	Total	Dry	Irrigated
Tarragona:	*Acres*	*Acres*	*Acres*	*Lb. per acre*[2]	*Lb. per acre*[2]
Lerida	15,122	395	15,517	178	357
Tarrangona	18,780	--	18,780	892	--
Total	33,902	395	34,297	--	--
Balearic Islands:					
Baleares	169,758	--	169,758	232	--
Levant:					
Alicante	69,855	19,150	89,005	446	535
Castellon	38,182	830	39,012	625	1,784
Murcia	69,287	--	69,287	375	--
Valencia	12,824	--	12,824	535	--
Total	190,148	19,980	210,128	464	589
Andalusia:					
Almeria	15,320	939	16,259	268	714
Cadiz	618	--	618	1,338	--
Cordoba	99	--	99	1,695	--
Granada	24,710	494	25,204	625	892
Huelva	3,487	--	3,487	535	--
Jaen	1,408	--	1,408	482	--
Malaga	12,602	74	12,676	625	892
Sevilla	371	--	371	1,784	--
Total	58,615	1,507	60,122	(3)	(3)
Other:					
Huesca	16,556	--	16,556	27	--
Salamanca	3,459	--	3,459	500	--
Other	23,588	150	23,738	--	--
Total	43,603	150	43,753	--	--
Grand total	496,029	22,029	518,058	401	598

[1] Harvested acres. [2] Kernel basis. [3] Not available.

Anuario Estadistico de la Production Agricola, Spanish Ministry of Agriculture, 1968.

Spain's almond acreage is irrigated (4 percent in 1968), irrigated acreage rose 19 percent in Alicante during this period. Producers in this Province are considered to be among the most advanced in Spain.

Government and trade personnel feel that production in the Levant region will increase substantially in the near future. Barring disease or severe weather damage, a 25-percent increase to 23,000 tons is possible by 1975.

The increasing importance of the Balearic Islands as a tourist haven has contributed to its demise as an almond-producing region. The large number of varieties found here and the shortage of fresh water are two other adverse factors.

Substantial production gains are expected in the Andalusia region. Located in southern Spain along the Mediterranean Sea, it is well protected against severe winter weather and damaging frosts during blossom period. Acreage is expanding rapidly, and production is expected to double, totaling 12,000 tons by 1975.

Varieties

According to the Spanish Ministry of Agriculture, almonds found in Spain are grouped in three major classes or categories: Hard shell (Dura), soft shell (Mollar), and semisoft shell (semi-Mollar). Hard-shell varieties account for the majority of almonds produced in Spain. These are the hardiest varieties, demanding less water and producing the highest yields. Soft-shell varieties account for approximately 5 percent of production. Brief descriptions of the principle varieties are listed below:

Hard shell:	
Marcona	Accounts for approximately 30 percent of total almond production; yields 4½ - 7¾ pounds of kernels per tree; has a shelling ratio of 23-25 percent; and has a late bloom, which constitutes a defense against frosts.
Ramillete	Drought-resistant variety; yields 4½ - 7¾ pounds per tree; shelling ratio of 23-25 percent.
Planeta	Good kernel flavor; shelling ratio of 21-25 percent; yields 4½ - 7¾ pounds per tree; offers little or no resistance to cryptogamic diseases (spore borne).
Largueta	Shelling ratio of 21-23 percent; long, plump kernel.
Desmayo	Late blooming; particularly resistant to late frosts and cold weather; accounts for about 20 percent of total production; has large, flat, elongated kernel.
Soft shell:	
Millar Fita	Yields 2½ pounds of kernels per tree; shelling ratio of 35-40 percent.
Blanqueta	Yields 2½ pounds of kernels per tree; shelling ratio of 35-40 percent
Semisoft shell:	
Pico de Cuevro	Yields 4½ - 6½ pounds of kernels per tree; shelling ratio of 24-30 percent.
Piedad	Yields 4½ - 6½ pounds per tree; shelling ratio of 30-33 percent.
Real Caragola	Yields 3½ - 4½ pounds per tree; shelling ratio of 32-35 percent.

As can be noted, the shelling ratio is quite low when compared to an average of 55 percent in the United States. To improve processing efficiency, the Ministry of Agriculture and numerous private individuals are evaluating new varieties, many of which were developed in foreign nations. Several of these varieties have been released for commercial use; however, the small number and immaturity of the trees make evaluation impossible at this time.

Cultural practices

A study recently released by the Spanish Ministry of Agriculture foresees demand for almonds increasing by 25,000 short tons (shelled basis) by 1975. To meet this increased demand, the report concludes that an additional 74,000 acres of almonds are required. Members of the trade contacted by the author felt that additional acreage is not required. Rather, they believe improved cultural procedures could fulfill increased demand.

Through the years, and even today, Spanish farmers have felt that almonds will give a return on unprofitable land where nothing else pays (olives and carobs excluded). This attitude has been a major factor behind the relegating of almonds to poor land and lack of attention to the crop. Today, advanced cultural practices are found almost exclusively in Tarragona and on the irrigated acreage in Alicante Province of the Levant region.

Seedlings and rootstocks.—Although cherry, plum, apricot, and peach have been used as rootstock, today the bitter almond is used almost exclusively. Seedlings are available from either state-owned or commercial nurseries. A growing number of commercial nurserymen are testing new varieties developed in the United States.

Pruning.—This operation is performed at the discretion of the individual farmer, with the procedure followed differing from area to area. However, in what might be termed "intensive production areas," two operations are performed:

- Fructification—the removal of diseased and superfluous branches in an effort to conserve the plant's nutrients;

- Rejuvenescence—the removal of old, thick branches, leaving secondary shoots or suckers to rejuvenate the trees.

Pruning takes place in late September and when the tree is green—that period of time when the tree is not dormant. Great care is taken to prevent gummosis.

Cultivation and intercropping.—In specialized plantings and also in areas where there is insufficient moisture for intercropping, the soil is clean-cultivated and smoothed. Two cultivations are reportedly common. Where there are intercrops, either fall or spring planted, the soil is plowed and leveled between plantings. Interplanting often embodies rotation of small grains and legumes. In Spain, only a relatively small acreage of almonds is believed to be intensively intercropped. Land suitable to such intensive cropping is gradually being taken out of almond production because of more profitable alternatives offered by annual crops.

Irrigation.–Owing to its limited volume, water is very valuable. Thus, irrigation is reserved for higher valued crops such as oranges and peaches. During the 1967-68 season, 24,688 acres were irrigated. Of this total, 20,213 acres were located in the Levant region.

Fertilization.–Commercial fertilizers, when applied without sufficient moisture, can kill or damage the plants. Since most acreage in Spain is raingrown, and rain is scarce, fertilizer usage is primarily limited to irrigated acreage. Three phases are involved in fertilization:

- Pre-planting: The land is prepared for the young trees. Muriate of potash, superphosphate, and manure are spread. Approximate dosages are:

Superphosphate	890 - 1,340 pounds per acre
Muriate of potash	360 - 535 pounds per acre
Manure	8 - 18 tons per acre

- Nonbearing: Each autumn growers apply a mixture of ammonium sulfate (30 percent), superphosphate (60 percent), and muriate of potash (10 percent). The following spring, when the rains arrive, a mixture of ammonium sulfate and ammonium nitrate may be applied.
- Producing: Beginning approximately 5 years after planting, the following mixture is used: ammonium sulfate (40 percent), superphosphate (40 percent), and muriate of potash (20 percent). Application usually occurs in the autumn and spring, with manure often being used as a supplement.

Spraying.–Because of the small size of most plantings, commercial spraying with fungicides and insecticides is not economically feasible. However, many of the larger, well-managed plantings in Levant and Tarragona have initiated pest-control programs involving DDT, Lindane, and Malathion.

Harvesting.–The crop is gathered over the August-October period. In the earliest blooming areas (Andalusia and Levant), harvesting starts in early August and extends into early October. In Tarragona and the Balearic Islands, late blooming regions, harvesting usually commences in early September.

Mechanical harvesting is not practiced in Spain. Rough terrain, small plantings, and abundance of labor, and the tendency to interplant crops are all factors contributing to the lack of mechanical harvesting. The most common method of harvesting is the placing of a plastic netting (ground cloth) under a tree, with the nuts then being knocked from the tree with a long stick.

In some regions, a semimechanical procedure has evolved. A cart, with cloth frames on three sides is drawn under a tree, and the almonds are knocked into the cart with a long stick.

Farm labor.–Spanish almond production is accomplished with a minimum of hired labor. On small farms, the operator and his family provide the labor. On larger units, part-time employees might be hired to assist during harvest and a few permanent field hands employed throughout the year. In 1970, minimum wages for workers were $1.78 per day.

Processing

Although there is some hand hulling, most large growers and processors use relatively modern mechanical hullers. The largest, with a 3/4-horsepower engine, has an output of 600 pounds per hour. In either case, hand or mechanical hulling, the almonds are sun dried for 2 to 4 days before hulling.

Packer-exporters buy their supplies from agents, speculators, and, on occasion, directly from the farmers. Presently, there is little or no contract buying.

Prices paid to farmers have leveled off in recent years, after rising markedly in the early 1960's. The 1968 opening price was 14.7 cents per pound of inshell nut, down slightly from the 1967 level, but nearly double the 1959 price of 7.6 cents.

Owing to the lack of storage facilities and the strong possibilities of rancidity, growers do not normally own cracking machinery. Inshell almonds usually arrive at the processors in 100-kilogram (220 lb.) burlap sacks, strictly separated by variety and category. Occasionally, large processors with adequate storage facilities accept bulk delivery. Small quantities of a variety are stored in burlap sacks, while larger quantities are stored in bulk bins, often underground.

Within the processing facilities, cracking generally occurs on the upper floors. The burlap sacks are placed on conveyer belts and mechanically lifted to the cracking area. There, the nuts are put through cracking machines, screened, and separated from the shell; sizing may occur at this time. The kernels then pass to a lower level to be given a final grading and sorting. This is usually done by a crew of women who grade and sort the kernels as they pass on a conveyer belt.

Following the final sorting, the almonds are either blanched or immediately packed for shipment (domestic and/or export). For export, almonds are packed in wooden boxes containing up to 50 kilograms (110 lb.), in cardboard boxes lined with plastic, holding up to 12.5 kilograms (27.5 lb.), or in 50-kilogram burlap sacks (often incorporating a plastic innerlining).

Prices received by Spanish producers for almonds in the shell[1]

Month	Monthly average					
	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*
September	16.4	14.8	14.8	14.6	16.0	14.7
October	17.0	14.3	14.2	13.6	15.4	14.7
November	17.0	13.6	15.3	14.0	13.3	15.4
December	15.9	13.2	14.3	14.3	13.7	15.3
January	15.0	14.3	14.1	14.2	14.7	15.9
February	14.9	14.1	14.7	14.2	15.2	15.7
March	14.8	14.0	14.4	14.5	15.1	15.8
April	15.0	14.3	14.6	14.9	14.8	16.2
May	14.8	14.3	14.5	15.8	15.8	16.7
June	14.8	14.4	14.6	16.5	15.1	17.1
July	15.0	14.8	15.0	16.7	15.3	17.0
August	15.1	15.0	14.1	16.2	15.2	18.3

[1] Converted at rate of 60 pesetas = $1.00 prior to November 1967. From November 1967, converted at 70 pesetas = $1.00.
Statistical Division, Spanish Ministry of Agriculture.

Processors, in an effort to offset rising processing and labor costs, are currently replacing outdated facilities. Innovations, many developed overseas, are being incorporated into the new plants. Included are electric eye sorters, bulk bin loaders, improved blanching ovens, and crackers.

Domestic consumption

Domestic consumption has risen rapidly over the past decade, with rising incomes and an increasing standard of living credited with stimulating consumer demand. Per capita income has more than doubled in the past 10 years, totaling $840 in 1969. Although reliable data are not available, Spanish consumption is believed to have averaged 8,300 tons during the 1965-69 period, as compared with 4,700 tons in 1957-61. This growth is expected to continue, with domestic utilization totaling 14,000 tons during the 1970-71 season.

The confectionary industry is believed to account for 50 percent of domestic consumption. Some major uses of almonds are nougat production, sugar-coated almonds, pastry and confectionary products in general, salted nuts, almond syrup and milk, flavoring for soft drinks, and almond oil in perfumes and cosmetics. The trade feels that snack packs, not commonly found in Spain today, will also develop into an important outlet in future years.

The domestic market is expected to absorb a large portion of the anticipated production increase. Domestic consumption amounted to 18 percent of total production in 1959-63 as compared with 27 percent for the most recent 5-year period. This figure is expected to reach 40 percent by the 1975 season.

Foreign trade

Although domestic usage is increasing, exports remain the major outlet for Spanish production. In 1962, export volume dropped sharply following a poor harvest. Since then, overseas shipments have demonstrated a mild upward trend, though volume has yet to attain pre-1962 levels. This growth is expected to continue, with exports totaling a record 34,000 tons by 1975.

Europe has traditionally been Spain's major export market. During the 1955-59 period, European countries accounted for 78 percent of the exports. By the 1968-69 season, this figure had risen to 89 percent, averaging 85 percent in 1964-68.

The effect of the Common Market has recently been felt by Spain. Although total volume to EC members has not dropped substantially, its share of Spanish exports has. In the 1968-69 season, the Common Market accounted for only 37 percent of Spain's exports as compared with 49 percent in 1964-65 and 42 percent in 1963-64. In January 1967, the EC levied a common external tariff of 7 percent on all almond imports from third countries. The 6-year preferential trade agreement signed between Spain and the EC went into effect on October 1, 1970. No duty concessions for almonds from Spain were granted.

The Spanish Government recently signed trade agreements with several East European nations. The improving economies of these nations, coupled with a desire for luxury goods, offers a strong marketing opportunity.

Spanish almond exports

[Shelled basis]

Country of destination	Average 1955-59	Average 1960-64	1965	1966	1967	1968
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
United States	1,212	427	215	309	269	323
Europe:						
European Community:						
Belgium-Luxembourg	90	174	101	132	104	185
France	4,098	7,031	5,389	6,317	5,014	5,326
Italy	28	139	144	100	36	180
Netherlands	59	241	157	251	211	314
West Germany	1,064	3,564	1,942	3,053	3,960	4,437
Total	5,339	11,149	7,733	9,853	9,325	10,442
Other Europe:						
Norway	314	901	1,159	1,197	1,157	1,661
Sweden	505	1,955	2,049	2,518	1,386	2,165
Switzerland	2,229	1,484	1,319	1,869	2,288	3,146
United Kingdom	3,166	5,912	5,338	6,720	4,078	5,787
Other	1,167	1,111	2,805	4,203	1,012	108
Total	7,381	11,363	12,720	16,507	9,921	14,437
Total Europe	12,720	22,512	20,453	26,360	19,246	24,879
Latin America:						
Argentina	--	107	218	586	321	182
Brazil	85	103	187	243	142	175
Mexico	128	92	59	229	90	86
Venezuela	32	95	119	202	138	186
Other	1,228	198	1,066	1,700	562	82
Total	1,473	595	1,649	2,960	1,253	711
Other countries:						
Algeria	80	62	--	110	205	--
Australia	78	134	80	68	148	113
Canada	467	857	607	819	392	437
Egypt	42	179	5	--	4	31
South Africa	23	136	199	281	223	196
Other	294	764	957	1,489	2,034	1,142
Total	984	2,132	1,848	2,767	3,006	1,919
Grand total	16,389	25,666	24,185	32,396	23,774	27,832

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Export price quotations for Spanish almonds, cost and freight the United Kingdom

Year	Spanish Unselected Valencias											
	July	August	September	October	November	December	January	February	March	April	May	June
	Cents per lb.	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*	*Cents per lb.*
1959-60	42.8	42.5	43.7	43.1	41.2	41.6	43.1	43.7	42.9	41.6	42.5	45.0
1960-61	44.1	48.1	50.0	50.0	50.6	49.4	51.9	50.6	47.5	46.9	46.9	48.7
1961-62	49.4	45.6	44.4	43.1	42.7	45.6	48.4	49.4	49.0	61.2	64.4	69.4
1962-63	65.6	65.0	68.1	71.2	75.0	73.1	74.4	73.1	69.6	63.7	68.7	68.1
1963-64	69.4	66.2	66.2	73.1	71.9	66.9	70.6	69.4	68.1	67.5	67.5	70.6
1964-65	70.0	70.0	69.4	66.9	64.4	61.2	63.1	63.1	64.0	63.1	64.4	66.2
1965-66	68.2	70.0	68.7	65.6	64.4	64.4	64.4	65.0	63.7	63.1	64.4	65.6
1966-67	65.6	65.0	63.1	61.9	62.5	61.9	62.7	63.1	62.7	62.5	64.7	66.7
1967-68	65.7	65.7	66.0	66.0	65.0	64.8	67.5	67.5	67.0	65.9	68.0	65.4
1968-69	64.8	63.2	59.5	61.6	63.7	65.0	66.6	66.4	67.5	68.0	72.9	74.5
1969-70	74.5	77.1	94.3	106.1	101.2	99.6	102.3	94.3	91.1	(1)	(1)	(1)

[1] Not available.

Gill and Duffus, *Edible Nut Statistics,* March 1970.

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